

Before the
Federal Communications Commission
Washington, DC

In the Matter of:

Technology Transitions

AT&T Petition to Launch a

**Proceeding Concerning the TDM-
to-IP Transition**

**Proposal of Iowa Network Services,
Inc. for Service-Based Technology
Transitions Experiment**

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GN Docket No. 13-5

GN Docket No. 12-353

Reply Comments of

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National Association of the Deaf (NAD)
Rehabilitation Engineering Research Center on
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Summary

The Samuelson-Glushko Technology Law & Policy Clinic (TLPC), Telecommunications for the Deaf and Hard of Hearing, Inc. (TDI), the National Association of the Deaf (NAD), and the Rehabilitation Engineering Research Center on Telecommunications Access (RERC-TA) respectfully reply to comments filed on the proposal submitted by Iowa Network Services (“INS”) in the above-referenced proceeding.

- The TLPC is a branch of Colorado Law’s clinical education program that seeks to make an impact on cutting-edge technology policy issues on behalf of the public interest.
- TDI provides leadership in achieving equal access to telecommunications, media, and information technologies for deaf and hard of hearing people.
- The NAD, founded in 1880, is the oldest civil rights organization in the United States and its mission is to preserve, protect, and promote the civil, human and linguistic rights of deaf and hard of hearing people in this country.
- The Telecom RERC (RERC-TA) is a joint project of the Technology Access Program at Gallaudet University, the Trace Center at the University of Wisconsin-Madison and Omnitor AB in Sweden. The RERC is funded by the U.S. Department of Education, National Institute on Disability and Rehabilitation Research, to carry out a program of research and development focused on technological solutions for universal access to telecommunications systems and products for people with disabilities.¹

The value of universal access highlighted in the *Technology Transitions Order* is particularly important because of the impact the value has on the lives of people with disabilities. The *Order’s* accessibility mandate will ensure that the ability of people with disabilities to access vital communications systems is both protected and expanded in the face of the transition.

¹ The portions of this document contributed by the RERC-TA were developed with funding in part from the National Institute on Disability and Rehabilitation Research, U.S. Department of Education, RERC on Telecommunications Access, grant # H133E090001. However, the contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.

² 47 U.S.C. § 214(a), (c) (before discontinuing any service, providers must apply for and receive

In addition to the accessibility mandate in the *Order*, the Commission has statutory obligations to ensure communications systems are accessible. The Telecommunications Act of 1996 and the Twenty-First Century Communications and Video Accessibility Act give the Commission affirmative authority to implement accessibility regulations for communications services and equipment regardless of the underlying protocol.

The INS Proposal does not meaningfully explore the specific operational steps INS will take to evaluate the implications of the transition on access for people with disabilities throughout this trial. The INS Proposal does not satisfy the *Order's* admonition to facilitate “an open and deliberative process to identify and address challenges.”

Migrating old technology, maintaining accessibility, and implementing new technology are complex undertakings. Thus, the Commission should require providers to recognize the accessibility issues implicit in the transition and specifically outline steps to evaluate these issues in their trial proposals. This will ensure that the Commission can confidently rely upon the data gained from these experiences to develop a template for a system-wide transition.

The Commission should require trial proposals to address accessibility in two ways. First, the Commission should require providers' proposals to evaluate the implications of incorporating emerging accessibility technology into their systems. The transition presents a once-in-a-century opportunity to expand accessibility on a system-wide basis. However, providers must test emerging accessibility technologies before injecting them into the delicate telecommunications system. Further, any trials must occur with these technologies in place to understand their implications across various systems. The Commission should guide this expansion in accessibility using information it has already collected to ensure existing knowledge is not overlooked and that the trials are designed to ensure interoperable solutions and optimal functionality.

Second, the Commission should require providers to discuss their methodologies for evaluating the transition's impact on current levels of accessibility for people with disabilities. The trials should evaluate the implications on compatibility of solutions to ensure that people that rely on old systems can communicate with those who have switched to new solutions.

Discussion

Over the past decade, the majority of telecommunications services have transitioned from using Time-Division Multiplexing (“TDM”) over circuit-switched networks to Internet Protocol (“IP”) over distributed networks. However, despite the shift, providers are required to maintain increasingly outdated TDM systems.²

In 2012, AT&T and the National Telecommunications Cooperative Association (“NTCA”) petitioned the Commission to allow telecommunications provider to conduct trials.³ The petitions suggested the trials as means by which the Commission can understand the implications of this transition without the threat of disruptions on a national scale.⁴

In the January 2014 *Technology Transitions Order*, the Commission approved the use of trials and outlined conditions under which they must occur. The Commission adopted this trial structure to “learn about the impact of the technology transitions on the customers.”⁵ Specifically, the Commission hopes to understand the implications of the transition on four fundamental values of modern telecommunications networks:

- Public safety and national security;
- Universal access;
- Competition; and
- Consumer protection.⁶

INS filed a proposal (the “INS Proposal”) seeking the Commission’s approval to execute a trial.⁷

² 47 U.S.C. § 214(a), (c) (before discontinuing any service, providers must apply for and receive Commission approval).

³ *Technology Transitions*, Order, Report and Order, and Further Notice of Proposed Rulemaking, GN Docket No. 13-5, ¶¶ 19-20 (Jan. 31, 2014) (“*Technology Transitions Order*”), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0131/FCC-14-5A1.pdf.

⁴ See Petition of AT&T, GN Docket No. 12-353 (Nov. 6 2012); Petition of NTCA, GN Docket No. 12-353 (Nov. 19 2012).

⁵ *Technology Transitions Order* at ¶ 8.

⁶ *Id.* at ¶ 23.

⁷ Application of INS, GN Docket No. 13-5 (Feb. 20, 2014) (“INS Proposal”), available at <http://apps.fcc.gov/ecfs/document/view?id=7521074109>.

We echo NA’s support for the trial process in general and INS’s decision to engage in this process.⁸ The Commission should encourage as many providers as possible across a variety of systems to conduct transition trials. The *Order* requires a robust evaluation of the transition in real-world environments, without which the system-wide transition might occur without a thorough understanding of possible implications.

However, we agree with AT&T and CenturyLink that the INS Proposal lacks sufficient detail to determine if the trial will provide the data essential to the learning process.⁹ Detailed disclosures of the trial methodology are essential to evaluating the validity and quality of the data generated by the trial. Without sufficient detail, the Commission cannot rely on the data generated by a trial to facilitate the “frank, open, and informed conversation” required by the *Order*.¹⁰ Further, the Commission will be unable to make data-driven decisions about the implications of the transition.

The Commission should require providers to structure their trials to address and evaluate the transition’s implications on discrete accessibility issues. These proposals should discuss the steps they will take to evaluate the transition’s implications on these issues. Moreover, because we cannot be sure that new accessibility technology will not disrupt the system, the trials should occur with accessibility features in place to the greatest extent possible.

The Commission should avoid setting a negative precedent by approving a plan without requiring a meaningful evaluation of the transition’s effect on assistive technologies and a detailed disclosure of the trial structure. By approving a plan lacking either of these features, the Commission would place the burden on itself and third parties unfamiliar with providers’ operations to extract the details of providers’ proposals. Approving a plan that fails to meaningfully evaluate accessibility issues is inconsistent with the goals of the *Order* and the

⁸ See Comments of NTCA, GN Docket No. 13-5, at 1-2 (Mar. 21, 2014).

⁹ Comments of AT&T Services, Inc., GN Docket 13-5 at 2, 7-8 (Mar. 21, 2014) (“AT&T Comments”); Comments of CenturyLink, GN Docket 13-5 at 7-8 (Mar. 21, 2014) (“CenturyLink Comments”).

¹⁰ *Technology Transitions Order* at ¶ 31.

Commission’s statutory obligations. Because the INS Proposal does not meaningfully evaluate the implications of the transition on accessibility, the Commission should not approve it.

I. The *Order* requires providers to submit proposals that deliberately evaluate the effect of the transition on four foundational network values and are designed to facilitate an “open, frank, and informed dialogue.”

The Commission issued the *Order* to facilitate trials and establish guidelines for conducting those trials.¹¹ The goal of the *Order* is to learn from those trials and use those lessons to develop a framework for facilitating a transition to an IP system while protecting the foundational values of the network.¹² As Commission Rosenworcel has recognized, overseeing such a dramatic shift will not be a simple task—and an effective transition will require a careful and deliberate approach along with a “dose of humility.”¹³ Implementing this learning process *before* transitioning reflects this humility.

The success of the trials, and the transition generally, should be judged by the effect they has on the lives of the people that rely on these networks.¹⁴ To ensure success, the *Order* recognizes four fundamental values that must be protected during the transition: public safety, competition, consumer protection, and universal service.¹⁵ Protecting these values is not just good policy; it is part of the Commission’s explicit and implicit statutory obligations under the Communications Act.¹⁶

¹¹ *Technology Transitions Order* at ¶ 22.

¹² *Id.* at 23.

¹³ *Oversight of the Federal Communications Commission: Hearing Before Subcomm. on Comm’n and Tech.*, 113th Cong. 1. (2012) (statement of Commissioner Rosenworcel, Commissioner, FCC), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315077A1.pdf.

¹⁴ *The Evolution of Wired Communications Networks: Before Subcomm. on Comm’n and Tech.* 113th Cong. 19, (2013), (statement of Harold Feld, Senior Vice President, Public Knowledge) *available at* <http://democrats.energycommerce.house.gov/sites/default/files/documents/Testimony-Feld-CT-Evolution-Wired-Communications-Networks-2013-10-23.pdf>.

¹⁵ *Technology Transitions Order* at ¶¶ 23, 37.

¹⁶ *See, e.g.*, 47 U.S.C. § 151, 617.

The *Order* requires trial proposals to include purpose, scope, geographic area, technical parameters, timelines, and regulatory relief necessary to undertake the trial.¹⁷ The plans must be detailed enough to facilitate “an open, frank, and informed dialogue” about a proposed experiment and its implications for the four values.¹⁸ The *Order* encourages providers to err on the side of over-inclusion to ensure transparency and maximize public input.¹⁹ By facilitating an open discussion, the Commission plans to elicit input from a broad range of affected parties and groups.²⁰ The Commission will then study this input and data generated by the trials to understand the threats, concerns, and effects of the transition.²¹

The Commission hopes to learn enough from these trials to develop a template for system-wide transition.²² The Commission will rely on this template to oversee the deployment of modern communications networks that retains the foundational values of legacy networks.²³ To facilitate this process, the *Order* requires that the trials be open enough to facilitate third party review and deliberate enough to produce meaningful results.²⁴

The Commission and the public cannot evaluate proposal’s strengths and weaknesses without understanding the structure of the proposed trial. Likewise, an evaluation that is not conducted within a valid experimental methodology has little value in assisting the Commission in developing a template for a system-wide transition.

¹⁷ *Technology Transitions Order* at ¶ 34.

¹⁸ *Id.* at ¶ 31.

¹⁹ *Id.*

²⁰ *Id.* at ¶¶ 31, 34.

²¹ *Id.* at ¶ 33.

²² *Id.* at ¶ 29.

²³ *Id.* at ¶ 33.

²⁴ *Id.*

II. Accessibility is a particularly important value to protect because it facilitates civic, social, and economic engagement for people with disabilities

Congress has long recognized the importance of engaging and respecting people with disabilities as equals within society.²⁵ Despite this recognition, people with disabilities must continue to fight for equal access through legislative and administrative protections.²⁶ While statutes like the Americans with Disabilities Act (“ADA”) have improved inclusiveness, this struggle is far from over.²⁷ People with disabilities earn lower wages and face higher rates of unemployment and poverty than Americans who do not have disabilities.²⁸ This problem is particularly significant when considering the large scale of those affected. As of 2010, approximately 36 million Americans were deaf or hard of hearing, more than 25 million American were blind or had vision loss, and over 70,000 Americans were both deaf and blind.²⁹

²⁵ *Americans With Disabilities Act of 1988: Joint Hearing Before the Subcomm. on the Handicapped of the Comm. On Labor and Human Resources and the Subcomm. on Select Education*, 100th Cong. 3, 10 (1988) (remarks of Senator Weicker urging support for the American with Disabilities Act as a matter of fundamental civil rights) (remarks of Senator Harkin supporting the ADA: “People with disabilities like racial and ethnic minorities and women, are entitled to obtain a job, enter a restaurant or hotel, ride a bus, listen to and watch TV, use the telephone, and use public services free from invidious discrimination and free from policies that exclude them solely on the basis of their disability. Every American must be guaranteed genuine opportunities to live their lives to the maximum of their potential.”), available at http://www.law.georgetown.edu/archiveada/documents/ada9-27-1988_000.pdf.

²⁶ P.T. Jaeger, *Telecommunications policy and individuals with disabilities: issues of accessibility and social inclusion in the policy and research agenda*, 30 *Telecommunications Policy* 112, 113 (2006)

²⁷ Letter from the National Council for the Disabled to the President George W. Bush, *Impact of the Americans with Disabilities Act: Assessing Progress Toward Achieving the Goals of the Americans with Disabilities Act*, (July 26, 2007) available at <http://www.ncd.gov/publications/2007/07262007>.

²⁸ S. Rep. No. 111–386, at 1 (2010) (“[I]n 2008, only 40 percent of working-age people with disabilities were employed, while almost 80 percent of those without disabilities were working.”); see also Matthew W. Brault, *Current Population Reports*, Americans With Disabilities: 2010 Household Economic Studies (July 2012), available at <http://www.census.gov/prod/2012pubs/p70-131.pdf>; Jaeger, *supra* note 26, at 113.

²⁹ *The Twenty First Century Communications and Video Accessibility Act of 2009: Hearing on H.R. 3101 Before Subcomm. on Comm’n’s, Tech, and the Internet of the Comm. on Energy and Commerce*, 111th Cong. 1-2 (2010) (statement of Lise Hamlin, on behalf of the Hearing Loss Association of American and the Coalition of Organizations for Accessible Technology) available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Testimony->

Lowering hurdles for societal participation for people with disabilities is critical to achieving equal access on a national scale.³⁰

Accessibility in communications networks is also critical for democratic and economic participation for people with disabilities.³¹ Congress recognized this when it passed the Twenty-First Century Communications and Video Accessibility Act of 2010 (“CVAA”).³² The CVAA reduces barriers to the expanding information economy by requiring modern content and communications services to prioritize accessibility in their products.³³ Furthermore, advances in technology have provided, and will continue to provide, people with disabilities with greater access to communications networks.

Hamlin-CTI-HR-3101-Twenty-First-Century-Communications-Video-Accessibility-Act-2010-6-10.pdf.

³⁰ Lesley Chenoweth and Daniela Stehlik, *Implications of social capital for the inclusion of people with disabilities and families in community life*, 8 Int’l J. of Inclusive Education 59, 59-60 (2004), available at <http://www.tandfonline.com/doi/pdf/10.1080/1360311032000139467>.

³¹ *Implementation of Sections 716 and 717 of the Communications Act of 1934*, Statement of Chairman Julius Genachowski, CG Docket Nos. 10-213 and 10-145, WT Docket No. 96-198, 26 FCC Rcd. 3133 (Mar. 3, 2011), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-11-37A1_Rcd.pdf (“There’s no longer a dispute on this central point: access to technology means access to jobs and full participation in our society and global economy.”); S. Rep. No. 111–386, at 1 (2010); Feld, *supra* note 14, at 4 (“The United States has consistently led the world in developing communications technologies because we begin with a fundamental value – all Americans should be able to communicate with each other”); *The ADA and Entertainment Technologies: Improving Accessibility from the Movie Screen to Your Mobile Device: Before the Comm. on Health, Education, Labor and Pensions, 113th Cong. 1* (2013) (statement of Karen Peltz Strauss, Deputy Chief of the Consumer and Governmental Affairs Bureau of the Federal Communications Comm.), available at <http://www.help.senate.gov/imo/media/doc/Strauss.pdf>.

³² *Innovation and Inclusion: The Americans with Disabilities Act: Before the Comm. on Commerce, Science, and Transportation, 111th Cong. 2* (May 26, 2010) (statement of Senator Jay Rockefeller) (“I believe that innovation can beget more inclusion, and I believe that when we extend opportunity more broadly, we multiply the benefits for every American.”).

³³ *21st Century Accessibility Act Passed*, News Release, Statement of Chairman Genachowski (“[The CVAA] will ensure that people with disabilities are not left behind and can share fully in the economic and social benefits of broadband. The law will enable people with disabilities to participate in our 21st century economy.”).

The Commission must pay special attention to accessibility in the transition because it has explicit statutory obligations to protect accessibility.³⁴ Moreover, these obligations impose separate and additional protections beyond those imposed by the Commission under Section 214. The Communications Act and the CVAA give the Commission the authority to establish rules for accessibility for both TDM-based and IP-based communications services and equipment.³⁵ The Commission's treatment of accessibility in the IP trials should reflect these statutory mandates.

Furthermore, expanding accessibility is not affected by political disputes that may affect other network values. There is little, if any, evidence on the record in this proceeding suggesting that principles of accessibility should not be carried forward into IP systems.

Market failures also support Commission intervention. Market forces have consistently failed to facilitate increased accessibility.³⁶ Because the market has not sufficiently addressed accessibility, there is a significant gap between available accessibility technology and the implementation of that technology.³⁷ In the past, the Commission has recognized this market failure and has taken measures to address it.³⁸ In the face of the transition, the Commission should not reverse course on this well-intentioned, well-established position. While the technology has changed, the underlying economics have not.³⁹

Finally, communications networks facilitate access to vital emergency services. It is critical to expand the avenues through which everyone can access emergency services and retain access to those services as new technologies, such as text-to-911, play an increasingly important role in

³⁴ *Implementations of Sections 716 and 717 of the Communications Act of 1934*, Notice of Proposed Rulemaking, CG Docket No. 10-213, 26 FCC Rcd. 3133, 3137-40, ¶¶ 7-13 (Mar. 3, 2011), available at

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-11-37A1.pdf.

³⁵ *See generally* 47 U.S.C. §§ 255, 617.

³⁶ Statement by Lise Hamlin, *supra* note 29, at 4-5.

³⁷ *IP-Enabled Services*, Report and Order, WC Docket No. 04-36, WT Docket No. 96-198, CG Docket No. 03-123, CC Docket No. 92-105, ¶ 17 (June 15, 2007).

³⁸ *Id.*

³⁹ Statement of Karen Peltz Strauss, *supra* note 31, at 3-4.

facilitating emergency access.⁴⁰ The Commission has recognized that accessibility of the phone system for people who are deaf and hard of hearing is integral to ensuring that they maintain access to emergency services.⁴¹ Because the issue of access to emergency services is closely tied to accessibility, the Commission is uniquely justified in protecting accessibility throughout the transition.

The Commission should give special consideration to accessibility by requiring proposals to thoroughly evaluate the implications of the transition on this issue. This evaluation should be conducted with accessibility built into the systems to ensure that success is measured with accessibility incorporated into the trials. Because ensuring that accessibility is carried forward into an IP system is authorized, necessary, and justified, the Commission should require a thorough examination of accessibility issues in these trials,

III. Because the INS Proposal does not sufficiently outline how it will evaluate the trial's implications on accessibility, the Commission cannot confidently rely on the data generated by the trial.

We agree with the concerns raised by AT&T and Centurylink that the INS trial is not sufficiently detailed to determine the type and validity of data that the INS trial will generate.⁴² The INS Proposal is not sufficiently detailed to foster a productive conversation about the trial's experimental structure and how this structure will evaluate the transition's implications on accessibility.

INS, a centralized equal access provider ("CEA") for rural local exchange carriers ("LECs") in Iowa, submitted a trial proposal seeking Commission approval to begin testing the transition from TDM to IP systems.⁴³ As a CEA, INS aggregates connection points for more than 140 rural

⁴⁰ Emergency Access Advisory Committee, *Report on TTY Transition*, pg. 6-8 (Mar. 2013) available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-319386A1.pdf.

⁴¹ See *Framework for Next Generation 911 Deployment*, Notice of Inquiry, PS Docket No. 10-225, 25 FCC Rcd. 17,869, 17,884-85 ¶¶ 44-45; see also Emergency Access Advisory Committee, *Report and Recommendations*, pg. 7-8 (2011) available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-312161A1.pdf.

⁴² AT&T Comments at 7-8; CenturyLink Comments at 7-8

⁴³ INS Proposal at 1-2, 19.

LECs to reduce technological costs and leverage market power on behalf of its members.⁴⁴ Any traffic that flows from outside of a member's local exchange area likely travels over INS's system into its LEC members' local exchange area.⁴⁵ In other words, anytime a customer from a member LEC originates a call to or terminates a call from outside of his or her local exchange area, the traffic probably goes through INS.⁴⁶ Therefore, it is likely that a significant amount of INS traffic that could be affected by the IP transition.

The INS Proposal outlines a three-step trial structure.⁴⁷ First, INS would solicit voluntary interconnection by external providers providing IP services.⁴⁸ INS would convert these services from IP to TDM at their tandems in Des Moines and continue to distribute traffic to its LECs using TDM.⁴⁹ Second, INS would test connecting IP traffic from all-IP external providers to the LECs' switches that connect with the INS network.⁵⁰ Finally, INS would test all-IP facilities from originating end user to termination with the called party.⁵¹ The final phase would complete the TDM to IP transition by eliminating conversion entirely.⁵²

The Proposal affirms INS's commitment to ensuring accessibility during the transition, which is not in question.⁵³ However, as other commenters point out, specific details about the proposed trial are fundamentally lacking, including an in-depth discussion of its structure and methodology.⁵⁴

These shortcomings are particularly evident in the Proposal's treatment of accessibility concerns. The Proposal provides limited operational insight into how INS intends to facilitate its

⁴⁴ *Id.* at 1-2

⁴⁵ *Id.* at 2-3

⁴⁶ *Id.*

⁴⁷ *Id.* at 7-8

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.* at 13-15.

⁵⁴ *E.g.*, CenturyLink Comments at 7-8.

high-level commitment to accessibility. The Proposal's limited commitments include: allowing a gradual phase in of accessibility technology, testing new IP assistive technology over the CEA network, case-by-case testing of existing technology, and maintaining TDM systems for as long as necessary to serve vulnerable populations.⁵⁵

The Proposal's treatment of accessibility provisions spans just over two pages. The Proposal does not outline what new technologies will be tested, the sample size that will be considered significant, the features that INS will evaluate throughout the process, or the timeframes over which the tests will occur. Importantly, the Proposal does not outline what will qualify as success in the experiments. Finally, the proposal does not discuss the data collection process in sufficient depth to inspire confidence.

Moreover, the proposal lacks the elements and structure necessary to facilitate a scientific evaluation of these implications, such as bias, error, and measures of significance. Even if these elements and structure do exist, they are not discussed in sufficient detail to evaluate the validity of the Proposal. This limits the ability of the Commission and the public to evaluate the structure of the trial. Because of these fundamental shortcomings, the Commission cannot confidently rely on the results produced by this trial during a system-wide transition.

IV. The Commission should not approve a proposal that does not recognize and outline how it intends to evaluate the expansion and protection of accessibility.

Any trial proposal should evaluate the transition's implications on protecting and expanding accessibility in telephone networks. There are two categories of discreet and complex issues that affect accessibility for the deaf and hard of hearing communities which providers should evaluate. First, providers should evaluate the extent that the transition affects the ability to implement devices, protocols, and applications that expand accessibility. Second, providers should evaluate the extent that the transition affects the compatibility of legacy technology and devices.

⁵⁵ INS Proposal at 13-15.

A. Opportunities for Expanding Access

The IP transition presents an opportunity to increase accessibility by enabling the use of applications and equipment that are not available on the TDM systems.⁵⁶ Because it is unacceptable to relegate people with disabilities to outdated modes of communications and technology, it is important that providers expand accessibility in parallel with protecting current levels of accessibility.⁵⁷ Design and testing of accessibility at the development stages of systems and technologies is critical to facilitating effective implementation of these technologies.⁵⁸ Further, testing at these early stages consistent with the principles of universal design that will help reduce costs and ensure compatibility with other applications as IP systems are developed and tested.⁵⁹ In addition to increasing access, these applications, if properly implemented, can lower federal spending by reducing reliance on costly relay services.

Three opportunities are viable enough to include here. First, video and higher quality audio, which was unavailable or limited on TDM networks, is available on IP networks.⁶⁰ IP-based video allows people that are deaf or hard of hearing to use video, mixed video and audio, or mixed text and video to communicate in a manner similar to in-person communications.⁶¹ Higher quality audio over IP has similar implications. TDM uses narrowband audio, which constrains the quality of audio over the network. IP systems can transmit using broadband for

⁵⁶ The FCC should facilitate this by establishing harmonized standards. Harmonized standards are essential to implementing RTT and intermixed voice, video, and text applications. The FCC should establish these standards to ensure that these applications work within and across different providers' networks. Ex Parte of RERC-TA, GN Docket No. 13-5, WC Docket 12-353, at 3 (Jan. 23, 2014) ("Jan. 23 RERC-TA Ex Parte").

⁵⁷ *How Internet Protocol-Enabled Services are changing the Face of Communications: A View from Government Officials, Before Subcomm. on Telecom. and the Internet*, 109th Cong. (April 27, 2005) (statement of Karen Peltz Strauss on behalf of Communications Services for the Deaf and Alliance for Public Technology).

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Brief of RERC-TA, GN Docket No. 13-5, at 2-3 (Dec. 10, 2013), *available at* <http://apps.fcc.gov/ecfs/document/view?id=7520961363> ("RERC-TA Brief").

⁶¹ *Id.* at 2-4.

audio and all other forms of media. This improvement in transmission quality allows people who are hard of hearing or who have speech disabilities to communicate over IP networks. Many people rely on clear transmissions to communicate via telephone.⁶² An increase in quality would expand access to people who might have been limited in the past by the quality and functionality constraints of TDM networks.

Second, bidirectional Real Time Text (“RTT”) allows users to see messages as they are being typed, unlike turn-based messaging apps such as SMS, where the message delivery is delayed until each message is complete.⁶³ RTT can be used alone or in combination with voice and video services, allowing users to communicate using text in a manner similar to a voice conversation.⁶⁴

The value of RTT is two-fold. First, it increases accessibility by allowing text conversations to look more like in-person conversations by eliminating long waits between messages.⁶⁵ Two, it increases access to emergency services by ensuring fast paced messaging.⁶⁶ RTT shortens communication times and transmits interrupted communications.⁶⁷ Shorter communication times can speed up response times. Incomplete communications provide emergency personnel with some useful information even if the communication is cut-off prior to completing the message.⁶⁸ Additionally, RTT allows late-deafened adults and others who can speak to speak but receive text back in an emergency.⁶⁹ This voice-carry-over type of communication was possible to some degree with TTYs on the PSTN, and should be fully available on IP networks.

⁶² RERC-TA, *Twelve Frequent Question on Real-time Text, Its Need, Role, and Proposed Requirements*, at 3, available at <http://trace.wisc.edu/911text/Frequent%20Questions%20on%20RTT.pdf>.

⁶³ *Id.*

⁶⁴ *Id.* at 3

⁶⁵ *Id.* at 4

⁶⁶ Real Time Text Taskforce, *What is Real-Time Text (RTT)?* (last visited Mar. 31, 2014), <http://www.realtimetext.org/>

⁶⁷ RERC-TA, *supra* note 62, at 3

⁶⁸ RERC-TA, *supra* note 62, at 4

⁶⁹ RERC-TA, *supra* note 62, at 4

Third, IP protocols allow providers to develop interoperable applications more easily than on TDM networks. Increased interoperability allows people to communicate seamlessly across applications, further reducing barriers to communications.⁷⁰ Interoperability will also allow people who require specialized applications or equipment to communicate with people on other systems, lowering barriers to connectivity and equal access.

Providers should methodically evaluate the implications of expanding access across their system at the trial stage in order to demonstrate a thoughtful approach to accessibility concerns. The Commission may miss the window created by the trials for expanding access if it does not take this opportunity seriously.

B. Threats to Accessibility

The IP transition may diminish current accessibility methods because legacy technology may not be compatible with IP systems or issues unique to IP systems that are not prevalent in TDM systems may arise.⁷¹ Providers should consider four issues that may degrade accessibility for people who are deaf or hard of hearing that providers should consider.

First, analog Text Telephone (“TTY”) devices may not work consistently when communications are transmitted over IP networks.⁷² TTY devices are sensitive and susceptible to garbling, potentially losing the message altogether when the message is converted from TDM to IP protocols and when transmitted over IP networks.⁷³ While much of the deaf and hard of hearing community has moved away from TTY devices to IP-based applications, approximately

⁷⁰ FCC, Public Safety and Homeland Security Bureau, *Internet Protocol (IP) Based Interoperability*, (last visited Mar. 31, 2014), <http://transition.fcc.gov/pshs/techtopics/tech-ip-interop.html>

⁷¹ RERC-TA Brief at 3-4.

⁷² *Id.* at 3; see also Emergency Access Advisory Committee, *Proposed procedures for the TTY as a text terminal in legacy 9-1-1 PSAPs without IP connection*, at 14 (Jun. 2013) available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0204/DOC-321704A1.pdf

⁷³ Jan. 23 RERC-TA Ex Parte at 2.

100,000 people that deaf or hard of hearing use TTYs and more than one-third of all text relay traffic is from TTYs.⁷⁴

TTY service must be maintained as long as there are TDM networks because they are the sole means of facilitating communication to people on TDM networks. As long as there are any TDM networks or network segments, a need will exist for transcoding gateways to allow those on TDM networks, who must use analog TTYs, to communicate with consumers and services who are on IP networks and using IP technologies. For example, users in rural or remote locations who do not yet have access to broadband and IP applications networks will continue to rely on analog telecommunications systems and TTYs.⁷⁵

Because some users still rely on TTY technology, providers should ensure that their plans evaluate the ability to maintain TTY compatibility between those on TDM networks, who must use TTYs, and those on IP networks where TTYs do not work reliably. Providers should evaluate compatibility for both TDM-to-IP and IP-to-TDM communications. Further, they should develop and test intuitive IP-based alternatives to replace the TTYs for users who move from TDM networks to IP networks.⁷⁶

In addition to evaluating the compatibility of TTYs and testing migration plans for TTY users during the transition, providers should evaluate strategies that facilitate TTY compatibility until the final PSTNs are retired. Because some areas may lag behind in the IP transition, all providers should retain compatibility so TTY users are able to access users on IP systems.⁷⁷

Second, IP networks have the potential to carry lower quality sound, which may limit accessibility for people who are hard of hearing.⁷⁸ People who are hard of hearing often require

⁷⁴ National Association for the Deaf, *TTY and TTY Relay Services*, (last visited Mar. 31, 2014), <http://www.nad.org/issues/telephone-and-relay-services/relay-services/tty>; *Report on TTY Transition*, *supra* note 40, at 12.

⁷⁵ RERC-TA Brief at 5.

⁷⁶ *Id.* at 4.

⁷⁷ *Id.* at 4.

⁷⁸ *Id.* at 2.

clear voice signals to understand the person on the other end of the line.⁷⁹ Similarly, people with difficulty speaking may require clear transmission of their voice for the receiving party to understand them.⁸⁰ IP networks may have diminished voice quality because IP networks may use lower-quality coder-decoders that reduce sound clarity.⁸¹ If the IP systems deliver sound on lower quality, people who rely on clear, high-quality communications signals may lose their ability to use voice calling. Providers should collect data on sound quality and test different solutions for these issues in their trials.

Third, Telecommunications Relay Services (“TRS”) may pose accessibility issues because of limited interoperability with Internet-based applications and the inability to contact emergency services.⁸² TRS services based on the TDM network may not interoperate with web-based applications.⁸³ This lack of interoperability will limit the ability of callers possessing only TDM capabilities to contact users that only use web-based services.⁸⁴ This lack of interoperability may create an artificial divide between TDM and IP users where such a divide is not necessary. Further, TRS services, while often superior to TTY devices, do not facilitate the direct and immediate communication often necessary in emergency situations. Providers must develop and test methods to ensure that people who are deaf or hard of hearing retain simple and direct access to emergency services on all platforms and without using TTYs.

Finally, in addition to TTYs, other important devices developed for TDM systems may fail when used over IP technology.⁸⁵ Equipment that is vital to both safety and commerce may be

⁷⁹ *Id.* at 2.

⁸⁰ *Id.* at 2.

⁸¹ *Id.* at 2.

⁸² Public Knowledge and CTC Technology and Energy, *A Brief Assessment of Engineering Issues Related to Trial Testing for IP Transition* (Jan. 13, 2014), at 12, 15, available at <http://www.publicknowledge.org/files/CTC-PK%20PSTN%20Report.pdf>

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *Id.* at 12.

affected, including: health-monitoring devices, alarm systems, ATMs, and fax machines.⁸⁶

Providers should develop and test plans to ensure that the users are provided with fully functional alternatives in the IP networks for equipment that is vital to health and safety.

V. The Commission must address the issues in the INS Proposal because of the precedential value for all trial proposals moving forward.

It is important that the Commission addresses the accessibility issues in the INS Proposal. The Commission should require a well-vetted experimental structure and detailed disclosures of this structure from the INS Proposal because it is the first. The requirements the Commission imposes here will set the tone for the remainder of the trial proposals.

We recognize that some complications related to the IP transition may not be applicable to INS because it is a managed service provider that transmits using non-Internet IP networks. Further, we recognize that the INS transition likely is similar to other network transitions that have occurred successfully other networks. However, the *Order* still requires a more thorough experimental design than the one offered in the INS Proposal.

An effective methodology and detailed disclosures are warranted in any undertaking, including in the INS Proposal, for two reasons. First, what the Commission decides and requires for the INS Proposal will set a precedent for future proposals. Thus, even though the INS transition may be a simple one, the Commission should treat as it would a more complex or novel proposal. The Commission should set a clear standard for the type of methodology that all proposals must incorporate. This standard, should apply regardless of a proposal complexity.

Second, the Commission can learn from even the simplest transition proposal. However, the proposal's structures must be experimentally sound to confidently rely on these lessons. If the

⁸⁶ After providers transitioned to a wireless IP network, customers in Fire Island, NY were unable to use some analog equipment on the new system, including: ATMs, fax machines, and medical monitoring devices. Jodie Griffin, *Lessons from Fire Island: Running Useful and Responsible Trials for the Phone Network Transition*, PUBLIC KNOWLEDGE (Mar. 7, 2014), <http://www.publicknowledge.org/news-blog/blogs/the-phone-network-transition-lessons-from-fire-island>.

Commission cannot rely the lessons learned in this trial, than the trial will not facilitate the type of learning necessary to undertake a system wide transition required in the Order.

The Commission should place the impetus on providers to either include the implications of the trial on accessibility or explain why certain concerns are not relevant in their system. Because the providers understand their systems, they are in the best position to understand issues they are likely to encounter in the face of the transition.

In addition to overseeing provider compliance, the Commission should use the knowledge base at its disposal to provide guidance on accessibility. In many cases, it may not be evident to providers how to find and apply such information, but it is essential that trials work towards interoperability and utilize appropriate functionality in new networks. This will not happen if Commission only mandates accessibility in general terms without helping to specify what this means in the new environment.

VI. Conclusion

Before approving any proposal, the Commission should provide guidance to trial providers on implementing accessibility in new networks and require providers to ensure that their trial structures are consistent with sound principles of experimental design. Additionally, the Commission should require trial providers to provide sufficient details about their experimental designs to facilitate review by the Commission and the public. These structures and disclosures are particularly important in the context of accessibility because of the breadth and complexity of issues that affect system accessibility in the IP transition. Because an effective and detailed trial proposal facilitates “an open and deliberative process,” the Commission should require providers, including INS, to evaluate the accessibility implications in their proposals. These requirements are consistent with the goals of the *Order* and necessary to ensure that people with disabilities remain connected to the telephone system during and after the IP transition.

Respectfully submitted,

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